

V. Parental care

Why is parental care more often
maternal than paternal?



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maternal than paternal?

Cost/ Benefit of parental care in females

<< Cost/ Benefit of parental care in males

then females should provide more parental care.

Female cost vs. benefit:

Females have already invested so much energy in making eggs.

Females are sure of their genes will pass on.

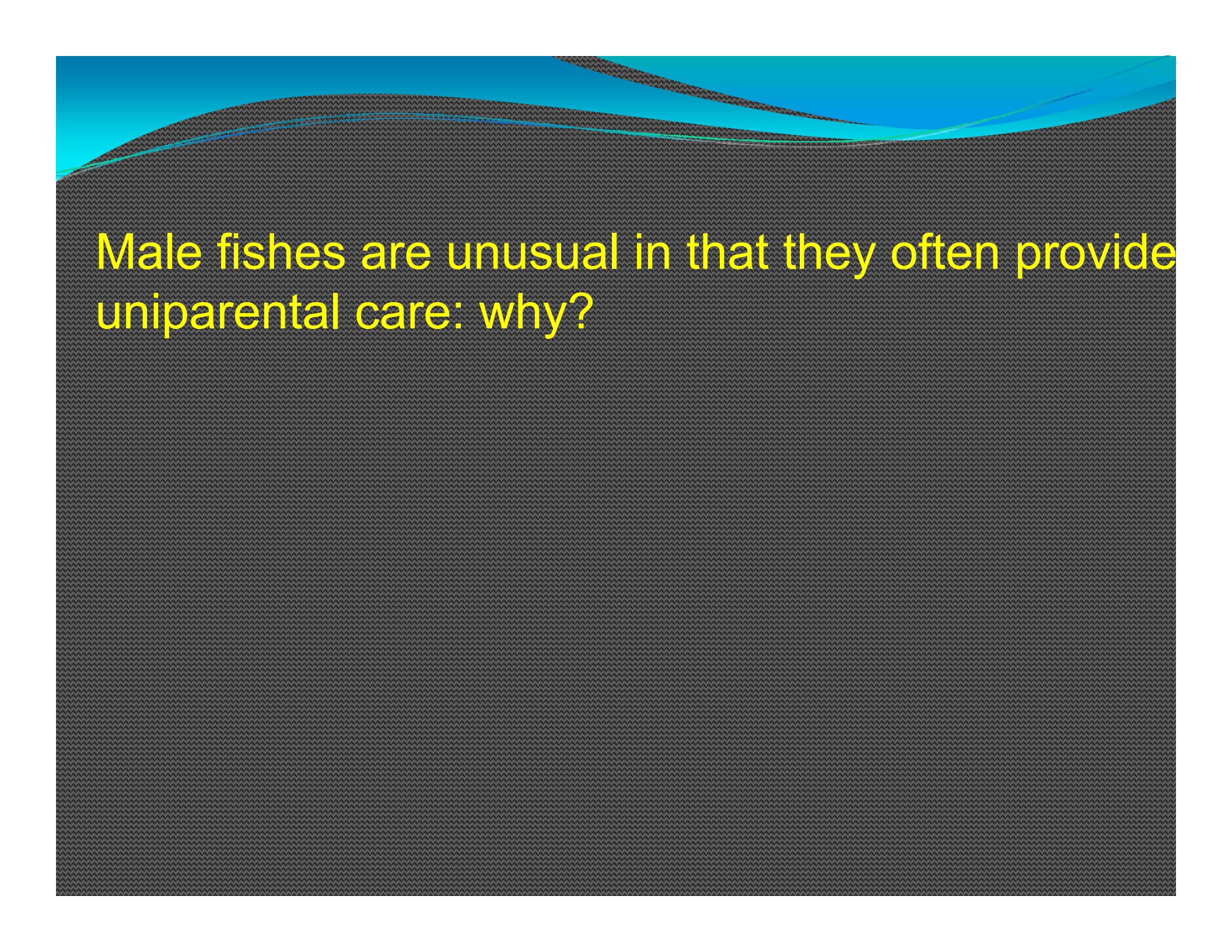
Offspring survival

Male cost vs. benefit:

Males tend to mate as many mates as possible, invest more energy on attracting females

Males are not sure if their genes will pass on.

Offspring survival



Male fishes are unusual in that they often provide uniparental care: why?

Parent-offspring recognition

Parents should avoid providing care to young that are not their own offspring.

But can parental animals always identify their own progeny? Not really!

Mexican free-tailed bats

Pregnant females form colonies in the millions...

~4000 pups per square meters

Can mother bats nurse discriminately?





Offspring recognition: function to prevent misdirected parental care.

Prediction: Parents should be especially good at identifying their own young in colonial species, but not as well in solitary species.

Bank swallows and rough-winged swallows

Bank swallows: **colonial** species,
fledglings have distinctive
begging calls



Rough-winged swallows:
solitary species: fledglings have,
less distinctive begging calls



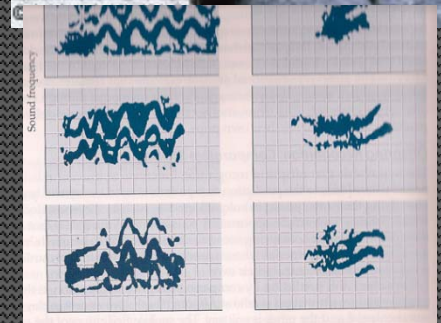
How do you test this correlation? Quiz!

Cliff swallows and barn swallows

Cliff swallows: **colonial** species;
nestlings have distinctive calls;
highly variable begging calls

Barn swallows: **solitary** species
fledglings have less distinctive calls

How do you test this correlation?
operant conditioning...



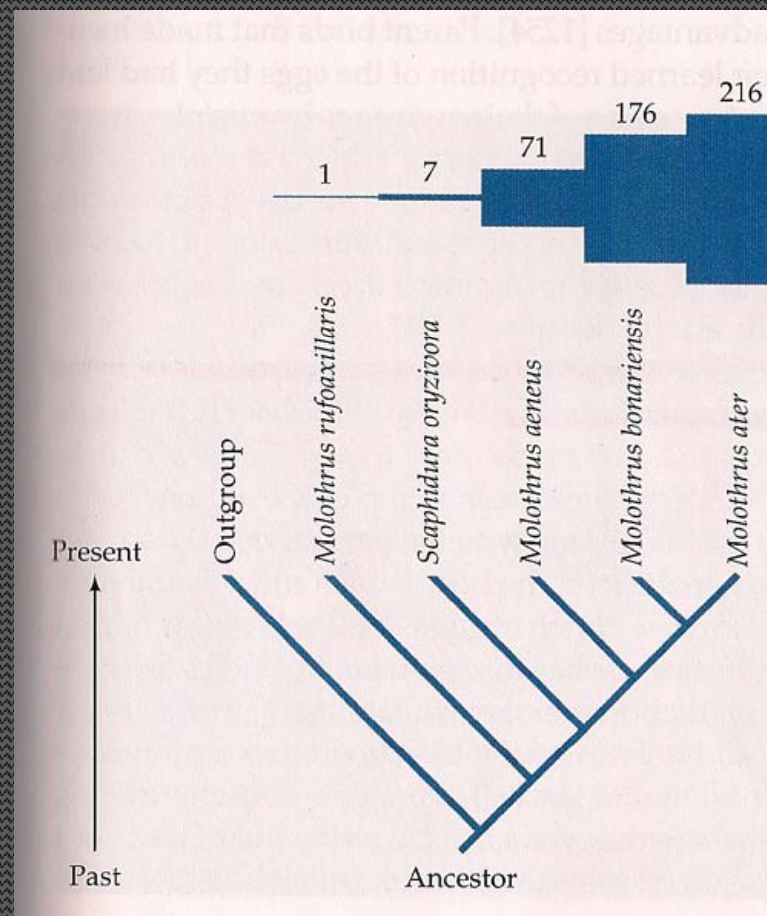
Interspecific brood parasitism

Brood parasitism in **brown-headed cowbirds**
host parents fail to discriminate parasitic young



Interspecific brood parasitism

How does brood parasitism evolve at the first place?



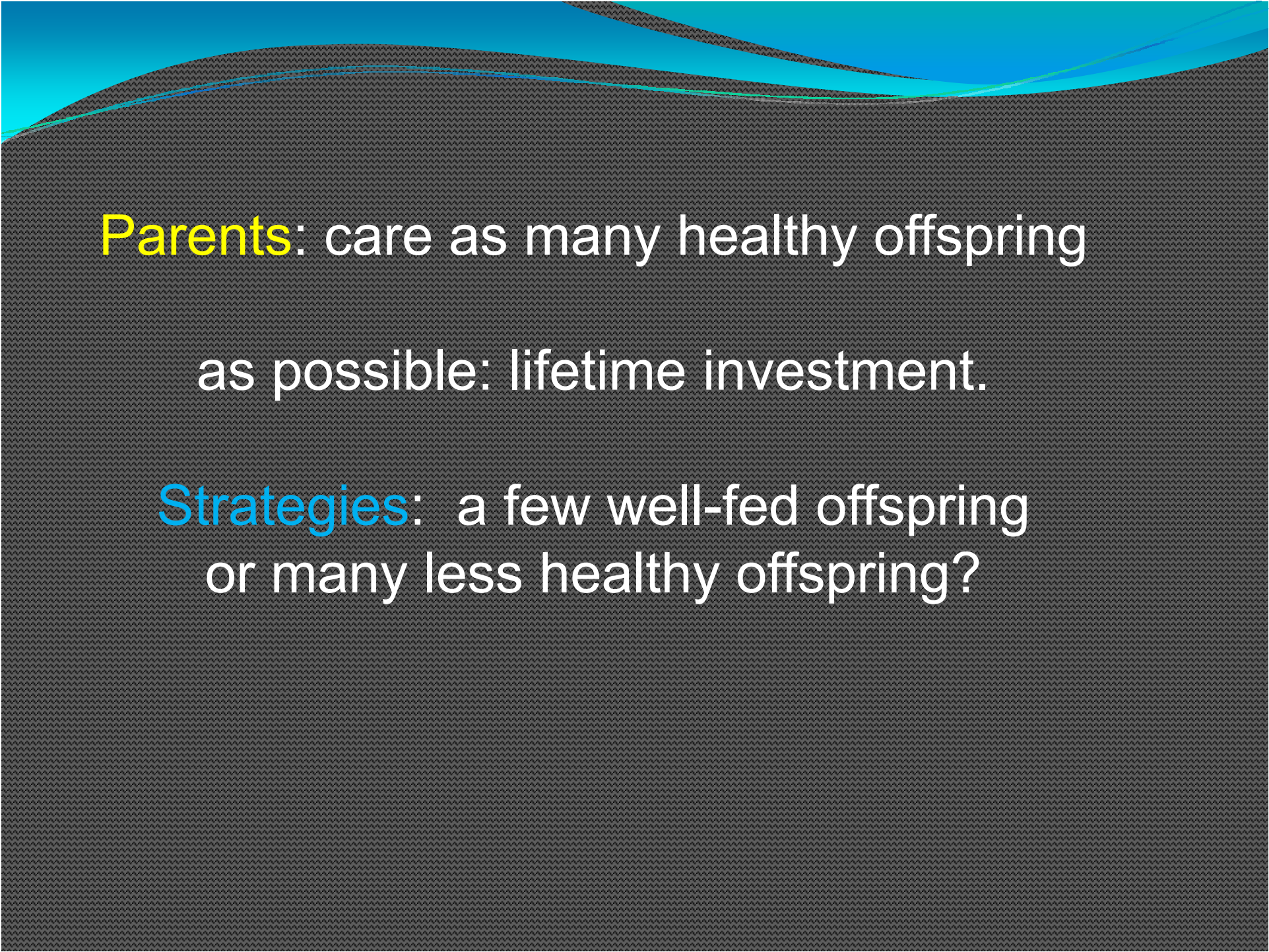
Phylogeny of
Cowbirds (*Molothrus*)



Parent-offspring conflict

by Robert Trivers

Benefit-cost conflict between parent-offspring



Parents: care as many healthy offspring
as possible: lifetime investment.

Strategies: a few well-fed offspring
or many less healthy offspring?



Offspring : maximize each individual's needs— at the cost of other offspring's survival.

Parent — offspring conflicts

Parent-offspring conflicts between **fetuses** and mom



Gestational diabetes...

Parent-offspring conflicts between **infants** and parents



Crying is a manipulative tool

Parent-offspring conflicts between **nestlings** and parents



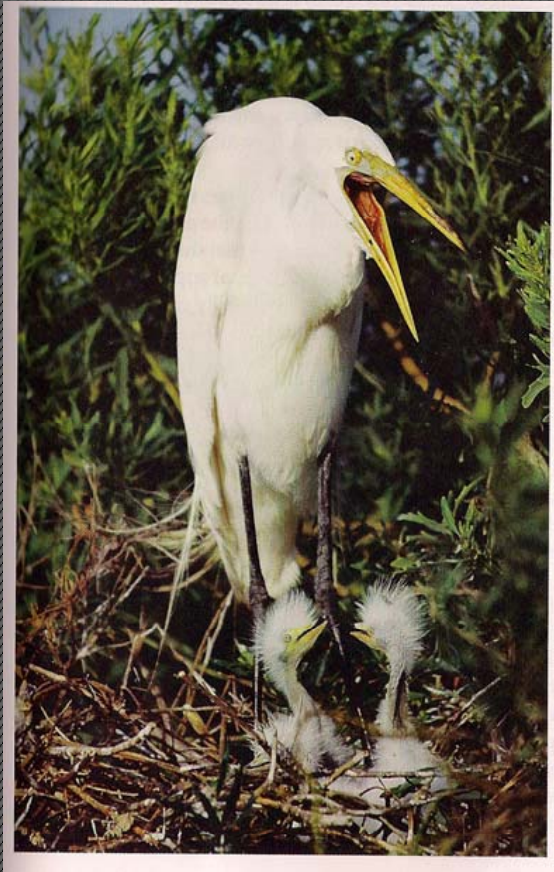
Begging call is a manipulative tool

How do parasitic cowbirds outcompete their host-siblings and manipulate host-parents?



1. Beg louder and earlier
2. Hatch earlier
3. Grow faster

Sibling rivalry



Egrets

Sibling competition,
First hatch → win

-- depend on resources

Parent-offspring conflicts between **babies** and parents





Parent-offspring conflicts

vs. Mating systems

Genetically monogamous species: less conflict

Polygamous species: more competition



In **polyandrous** primates :

Fetuses grow faster in uterus and taking more maternal resources, compare to **monogamous** primates.

Kinship

Belding's ground squirrels give alarm calls when a predator is spotted.





Belding's ground squirrels give alarm calls when a predator is spotted.

- warn nearby individuals

- at the risk of their own lives

- females, not males, give alarm calls



Belding's ground squirrels give alarm calls when a predator is spotted.

Hypothesis: females give alarm calls, because they are warning their close kin.



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Hypothesis: females give alarm calls, because they are warning their **close kin**.

How do you test this hypothesis?

Kinship theory (W. D. Halmilton)

Inclusive fitness: an individual's total fitness is based on the number of its own offspring and the contribution it makes to the reproductive success of its genetic relatives.

include both **direct** fitness (your own offspring) and **indirect** fitness (your sib's offspring, your grandchildren).